CLAIMS

What is claimed is:

1.   A Tx line driver with selectable pre-emphasis and primary current levels, comprising:

a primary current driver for producing, based on an input serial data stream, an output serial data stream at an output node having a primary current level based upon a selectable primary reference current level;

a primary current selection module for generating the selectable primary reference current to the primary current driver;

a pre-emphasis current driver coupled to produce pre-emphasis current to the output node based upon a selectable pre-emphasis reference current;

a pre-emphasis current selection module for generating the selectable pre-emphasis reference current to the pre-emphasis current driver independent of the primary current selection module;

logic for selecting one of a plurality of selectable reference currents of the primary and pre-emphasis current selection modules, the logic producing current setting control signals to the pre-emphasis current selection module and to primary current selection module; and

logic for producing a pre-emphasis signal.

2.   The Tx line driver of claim 1 wherein the logic produces the pre-emphasis signal to generate a positive pre-emphasis current for a duration of one bit period whenever the input serial data stream has a transition from at least one of a transition from a logic zero to a logic one and/or a transition from a logic one to a logic zero.

3.   The Tx line driver of claim 1 further including a first current mirror wherein the logic produces the current setting control signals to selectively couple at least one of a

plurality of scaled devices as a reference device within the first current mirror to generate the selectable reference current for a second mirror device coupled to the pre-emphasis current driver wherein the mirror device sets a current level of the pre-emphasis current driver.

4.   The Tx line driver of claim 1 wherein the current selection module comprises a digital-to-analog converter (DAC) that includes a plurality of scaled MOSFET devices to provide differing amounts of reference current when connected as a reference device in the first current mirror.

5.   The Tx line driver of claim 1 wherein the pre-emphasis current driver produces a positive current responsive to a first logic state of the pre-emphasis signal and a negative current for a second logic state of the pre-emphasis signal.

6.   The Tx line driver of claim 1 further including two pre-drivers wherein each is coupled to provide the input serial data stream to the primary current driver and the pre-emphasis current driver, respectively.

7.   The Tx line driver of claim 6 wherein each pre-driver comprises a differential pair coupled to receive a differential signal and wherein differential outputs of each of the differential pairs is coupled to inputs of a differential pair of the primary and pre-emphasis current drivers, respectively.

8.   A Tx line driver with selectable pre-emphasis and driver signal magnitudes, comprising:
          at least part of a first current mirror;
          a primary current driver module coupled to the at least part of the first current mirror, wherein the first current mirror sets a primary current driver level;
          a first current selection module including a first

plurality of scaled devices wherein at least one of the first plurality of scaled devices is selectable based on a first control signal, the first current selection module providing a first reference current for the first current mirror;

a first pre-driver coupled to the primary current driver module to provide an input data stream to the primary current driver;

at least part of a second current mirror;

a pre-emphasis current driver module coupled to at least part of the second current mirror, the pre-emphasis current driver module producing one of a positive or a negative current level based upon a logic state of a pre-emphasis signal, wherein the second current mirror sets a pre-emphasis current level;

a second current selection module including a second plurality of scaled devices wherein at least one of the second plurality of scaled devices is selectable based on a second control signal, the second current selection module providing a second reference current, independent of the first reference current, for the second current mirror;

a second pre-driver coupled to the pre-emphasis current driver module to provide the pre-emphasis signal to the pre-emphasis current driver; and

logic circuitry coupled to provide control signals for selecting the at least one selectable scaled device of each of the first and second current selection modules.

9.   The Tx line driver of claim 8 wherein the first current selection module comprises a digital-to-analog converter module (DAC), wherein each scaled device of the first plurality of scaled devices has different current conduction properties from the other scaled devices of the first plurality of scaled devices.

10.   The Tx line driver of claim 8 wherein the second current selection module comprises a digital-to-analog converter

module (DAC), wherein each scaled device of the second plurality of scaled devices has different current conduction properties from the other scaled devices of the second plurality of scaled devices.

11.    The Tx line driver of claim 8 further including logic for generating the pre-emphasis signal to the pre-emphasis pre-driver in a differential form.

12.    A Tx line driver, comprising:
        a primary current driver coupled to provide drive current for an outgoing data stream at an output node;
        a pre-emphasis current driver coupled to provide pre-emphasis current for an outgoing bit of the data stream at the output node; and
        a current selection module for providing a selectable reference current level, independent of a reference current level for the primary current driver, to the pre-emphasis current driver responsive to a transition in the outgoing data stream to prompt the pre-emphasis current driver to generate a corresponding amount of pre-emphasis current.

13.    The Tx line driver of claim 12 further including logic circuitry for selecting the selectable reference current levels and for providing a pre-emphasis control signal to create the reference current and the corresponding pre-emphasis current.

14.    The Tx line driver of claim 13 wherein the logic circuitry transmits pre-emphasis current settings as a binary signal to the current selection module to select at least one scaled device for producing the reference current level for the pre-emphasis current driver.

15.    The Tx line driver of claim 14 wherein the current selection module comprises a digital-to-analog converter

(DAC) with selectable scaled devices to produce differing reference current levels.

16. The Tx line driver of claim 15 further including a primary current driver, first and second pre-drivers, the first and second pre-drivers for providing an input data stream being transmitted by the Tx line driver to the primary and pre-emphasis current drivers, respectively.

17. The Tx line driver of claim 16 wherein the pre-emphasis current provided by the pre-emphasis current driver has a positive magnitude following a specified transition and a negative magnitude otherwise.

18. The Tx line driver of claim 12 further including logic for determining that a transition has occurred in an input data stream and for generating a pre-emphasis signal to cause current to be added or subtracted from the output current produced by the primary current driver for every bit output by the Tx line driver.

19. A method in a Tx line driver for generating a pre-emphasis signal for a first bit following a transition in a data stream, comprising:
    transmitting pre-emphasis current setting signals to a first current selection module to prompt the current selection module to generate a specified amount of reference current upon receiving a pre-emphasis signal;
    determining whether a transition has occurred in the data bit stream from one bit to another;
    producing the pre-emphasis control signal;
    producing the pre-emphasis current; and
    summing the pre-emphasis current and a primary current in an outgoing data stream.

20.  The method of claim 19 further including generating primary current setting signals to a second current selection module to prompt the second current selection module to generate a specified amount of reference current to prompt the primary current driver to generate the primary current.

21.  The method of claim 20 wherein the steps of generating primary and pre-emphasis current setting signals includes producing a binary signal corresponding to a combination of scaled devices within each of the first and second modules, the scaled devices the current selection device having differing current conduction properties.

22.  The method of claim 21 wherein the binary signal selects only one of a plurality of devices for coupling as a reference device in a current mirror.

23.  The method of claim 21 wherein the binary signal selects a plurality of devices being coupled as a reference device in a current mirror.

24.  The method of claim 20 further including producing a positive pre-emphasis current for a first logic state of the pre-emphasis signal and a negative pre-emphasis current for a second state of the pre-emphasis signal.